

INTEGRATED ASSESSMENT OF THE CLIMATE CHANGE IMPACTS ON THE GULF COAST REGION

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Part I

Gulf Coast Regional Climate Change Assessment

Chapter 1

Gulf Coast Regional Assessment History

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1.1 Introduction

1.2 The Regional Assessment Workshop

1.3 The Regional Assessment Research, Education, and Outreach Activities

1.4 Assessment Approach and Methodology

1.1 Introduction

The Gulf Coast region includes five Gulf Coast states. The specific territories covered in the assessment are the Gulf Coastal Plains and coastal waters of southern Texas, southern Louisiana, southern Mississippi, southern Alabama, and western Florida (Fig. 1). The Gulf itself has a surface area of 1.63 million square kilometers (630,000 square miles) and a watershed area of 4.69 million square kilometers (1.81 million square miles) in the United States. This region is one of the nation's largest ecological systems and is closely linked to a significant portion of the nation's economy. Energy, fisheries, agriculture, forests, and tourism rank among the most significant sectors of the Gulf Coast region's economy. The Gulf has five of the nation's top ten fishing ports. Gulf ports handle one half of the nation's import-export tonnage and the Gulf produces 72% of the nation's offshore petroleum production. The Gulf Coast region relies on many natural resources to fuel many important sectors of its economy.

1.2 The Regional Assessment Workshop

To start the regional assessment, the regional assessment team, sponsored by the USEPA, led the region by hosting the Gulf Coast Regional Climate Change Workshop and Public Forum on February 25-27, 1998 (Fig. 2). The workshop participants identified the distinctive regional characteristics and potential consequences of climate variability and change. The workshop participants identified numerous issues of regional concern. Coastal ecosystems, forests, water and air quality, fisheries, commerce, industry, and energy, were the key sectors that they considered

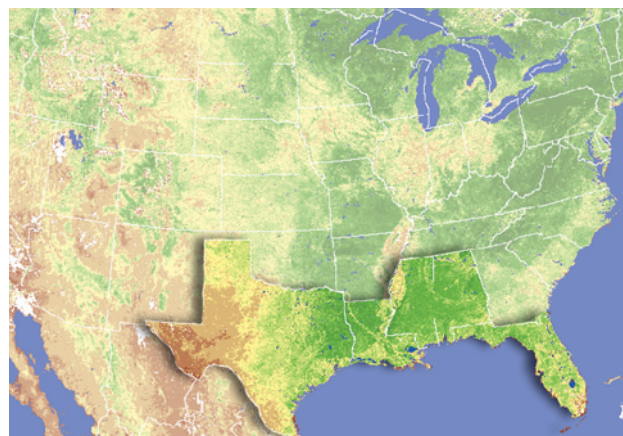


Figure 1. The Gulf Coast region defined by the first National Assessment.

vulnerable to climate change. Chapter 2 section 7 of this publication summarizes the key findings of these key sectors/issues at the workshop.

Significant technical contributions to the Workshop were provided by the Workshop Steering Committee members, who represented Southern University, the USGCRP, the White House Office of Science and Technology Policy (OSTP), the National Wetland Research Center (NWRC), Science and Engineering Alliance (SEA), Southern Regional Climate Center (SRCC), National Center for Atmospheric Research (NCAR), NASA, USDA Forest Service, Louisiana State University (LSU), Florida State University (FSU), and Tulane University.

The main purpose of this Workshop was to examine the regional vulnerabilities to climate variability and change and to obtain information that could be aggregated across regions to support the national climate change assessment. The specific objectives of the Workshop were to

- (1) Identify current stresses or issues of concern in the region;
- (2) Examine how greater climate variability and climate change might interact with the current stresses;
- (3) Discuss information needs to further the assessment process;
- (4) Identify possible coping mechanisms and define a regional research agenda; and
- (5) Design regional follow-up assessment activities.

More than 200 scientists, policy makers, stakeholders, industry representatives, state, regional, and national experts attended the Workshop. Minorities, African Americans, Asians, Hispanics, and Native Americans, in the region were well represented. In addition, the Workshop included participants from the Canadian Ministry of the Environment, and international scientists and students.

The Workshop was extensively covered by the media. A total of eight newspaper articles, four TV news reports, and four radio news reports were generated. Based on the Workshop results, a report has been compiled by the project directors and the breakout session leaders. The report (USGCRP, 1998a) reflected the scope, participation, program, recommendations, and findings. It also includes transcripts of the presentations made by some of the plenary speakers and keynote speakers. The Workshop Steering Committee provided an opportunity for the participants to enhance their contribution through a peer-reviewed compendium published in addition to the Workshop final report. It included articles on climate change and related research findings, climate projections (modeling efforts), and overviews on crucial issues.

The Workshop was an important part of this nation's effort to improve understanding of the present and potential consequences of climate variability and change, both detrimental and beneficial, and to provide a context for understanding these consequences in relation to the pressures created by other long-term stresses on the environment and society. We used the findings and recommendations to adjust the direction of the assessment research program and to support the national assessment activities organized by the USGCRP and the international assessment activities organized by the IPCC. The Workshop helped the regional participants to increase their understanding of what is known, unknown, and uncertain related to the potential con-



Figure 2. A session at the Gulf Coast Regional Climate Change Workshop.

sequences of climate variability and change for the Gulf Coast region. The Workshop also provided helpful information to those who protect and utilize our nation's natural resources, who provide for our food, fiber, and economic resources, and who would determine local, national, and international policies.

1.3 The Regional Assessment Research, Education, and Outreach Activities

The regional team began an integrated assessment of potential consequences of climate change for the Gulf Coast region after the conclusion of the Workshop. Of those sectors/issues the participants identified, the regional assessment research team, due to time and resource constraints, chose two for further work: coastal ecosystems, and maritime (bottomland) forest resources. Case Studies and major findings of the further assessment into those two issues are summarized in Part II and Part III of this publication. The overall goal of the integrated assessment effort was to analyze and evaluate potential consequences of climate variability and change for the region in the context of other pressures on the people, environment, and natural resources. Specific objectives were to

1. Select and apply climate scenarios/models, ecosystem models, and socio-economic trends scenarios to regional data bases,
2. Assess climate change impacts on sectors within the region with emphasis on coastal ecosystems and maritime (bottomland) forests,
3. Identify coping strategies and research needs, and

4. Undertake outreach efforts to stakeholders especially minority communities, small limited resource farmers, minority farmers, small forest woodland owners, and socially and economically disadvantaged communities.

The regional assessment recognized the interrelationship between the physical or natural environment and human activities. This relationship balances the environmental and economic attributes of a region by linking the goals of environmental protection and economic development. Ecological, economic, social, and cultural values related to coastal ecosystems and maritime forests were incorporated into the assessment process. The process also included climate scenarios, ecosystem models, and socioeconomic trends. Assessment of these two key issues was performed through a range of illustrative and supportive case studies. The case studies approach added substance to the assessment. Case study results also provided sound and scientific data to support the impact projections and analyses. Each case study was of importance to answer questions related to key issues. The title and the content of each chapter of this book is based on the topic and the results of each case study conducted.

The lead institution, Southern University and A&M College (SU), is an 1890 land-grant Historically Black College and University (HBCU). Southern University is the largest institution within the nation's historically black university system with 5 campuses and is optimally positioned to serve African American and other minority communities in the Gulf Coast region. To promote regional participation, this assessment was accomplished by the joint efforts of Southern University, Louisiana State University, National Wetland Research Center, and Alabama A&M State University (an HBCU).

Outreach and stakeholder involvement were also a fundamental component of the assessment. The stakeholder network that was initially established through the Gulf Coast Regional Climate Change Assessment Workshop was expanded. These stakeholders included policy makers, managers, planners, scientists, private business owners, farmers, fishermen, minorities, and low-income communities. Outreach meetings were hosted to obtain detailed information on key issues, concerns, coping strategies, and information needs.

The assessment provided answers to four questions: 1. What are the current environmental stresses and how are they likely to play out in the future without a change in climate or climate variability? 2. How will a change in climate or climate variability affect these environmental stresses? 3. How can people cope with climate variability and change in ways that help with other environmental stresses? 4. What research is needed to better estimate the consequences of climate variability and change?

1.4 Assessment Approach and Methodology

1. Setting the regional baselines and scenarios

A sound understanding of current conditions and future trends is necessary for the conduct of any climate change impact assessment. Therefore, the first step of the assessment was the establishment of regional baselines and scenarios.

Baselines for the regional climate, human environment, and natural environment, and possible future scenarios were established based on the Workshop participants' inputs, literature, and scientific data. The three baselines were established simultaneously in order to describe current conditions in the region. The established current condition provided information for the projection of future scenarios. The projected future climate scenario and human environmental scenario were synthesized to provide information for the projection of the natural environmental scenario. Information obtained from the baseline conditions and climate scenarios was used to assess the impact of climate change on the natural environment, human, society, and economy of the region.

2. Selection of two specific priority sectors: coastal ecosystems and maritime forests

This assessment investigated the implications from climate change on the natural environment of coastal ecosystems and maritime forests. The assessment of the impact on the natural environment provided information for understanding both the causes and impacts of societal responses to climate change. Also, the assessment of the natural environment was integrated with the assessment of the socioeconomic/human environment impact in order to provide a comprehensive understanding of the human dimensions of the change.

3. Literature review of the current condition of selected ecosystems, their socioeconomical significance, and the potential climate change impacts on the selected ecosystems

An extensive literature review enabled the team to access information on the current condition of the selected ecosystems, their socioeconomical significance, and the potential climate change impacts on these selected ecosystems. The potential consequences and impacts of climate variability and change on the region's natural and socio-economic/human environment was assessed by integrating the following: 1) background information on the region's natural and socioeconomic/human environment, in which its people live; 2) the region's historical climate; and 3) likely changes in its future climate.

4. Summarizing the literature review and incorporating case study results as quantitative examples to illustrate and support the qualitative and quantitative information

We accomplished the research and assessment activities through case studies. The case studies added substance to the assessment by providing sound scientific data to support the impact predictions and analyses. Each case study was designed to answer questions that relate to a key issue. The specific ecological systems and locations of the case studies were chosen based on their representativeness of the Gulf Coast region. Through these case studies, team members have:

- ☀ Established baseline conditions,
- ☀ Described the role of natural and human environment in the regional economy,
- ☀ Summarized the effects of current climate variability and change,
- ☀ Predicted future effects of climate variability and change,
- ☀ Analyzed the impact of human activity,
- ☀ Provided a qualitative assessment of the consequences on the region's economy,
- ☀ Developed management/adaptation/coping strategies, and
- ☀ Defined future research needs.

5. Conducting a qualitative assessment of the socioeconomic implications of the projected ecological changes in these sectors through case studies

The major source for making the qualitative assessment was the current literature. Team members presented the results of projected socioeconomic impacts from the case studies to stakeholders at meetings and gathered information on the socioeconomic impacts that the local community is currently experiencing and feel they could experience in the future.

6. Generating, through case studies and outreach activities, an array of adaptation strategies that merit further investigation

The results of analytical work, outreach activities, and the outcomes obtained in steps 1-5 provided the information and input to accomplish step 6. In the process of accomplishing step 1-5, the assessment team members assessed the vulnerability of people in response to the consequences of climate change, and developed coping strategies based on these consequences and related vulnerabilities. Through the case studies and the sectional assessment, scientists obtained a better understanding of what is known and what is unknown. Based on the findings, the future research needs were identified.

7. Defining coping strategies and future research needs based on the work described above and stakeholders input

In the process of accomplishing this assessment, two symposia, two meetings, one roundtable, two summer institutes, and numerous seminars were organized. These venues provided the stakeholders a variety of fora for discussing coping strategies and research needs. The stakeholder input reflected the real needs of the people in this region. Questionnaires were distributed to obtain a broad input for the public on coping strategies and research needs.

Coping strategies and research needs were synthesized from the several activities and evaluated for consistency across activities and for feasibility. Candidate coping strategies were analyzed with respect to institutional constraints and other potential barriers to their implementation. Research needs were analyzed with respect to their compatibility with existing research programs and ranked by priority of the needed research results.

8. Integration of information/results into regional assessment publications

Assessment results were combined and integrated prior to publication. Volunteers, identified

as technical experts, conducted extensive technical peer review of the regional assessment publications for scientific and technical accuracy and validity. Provisions were also made for including general comments from stakeholders. The review procedures were coordinated by the assessment Team Leader. The Team Leader provided a central distribution and receiving point for written reviews. The Team Leader was also responsible for responding to and documenting the responses to written review comments. (see Appendix 1 for documented peer review process)

REFERENCE

USGCRP 1998. Gulf Coast Regional Climate Change Workshop Report, compiled by Zhu H. Ning and the regional assessment team members for the USGCRP, can be found at <http://www.nacc.usgcrp.gov/regions/gulfcoast.html>

